DRAWINGS

Attached please find formal replacement FIGS. 1-2 for the originally-submitted FIGS. 1-2. The new formal replacement figures add no new matter. The replacement FIGS. 1-2 now include a "Prior Art" legend.

REMARKS

Claims 11-28 are pending in this application. Attached hereto is a complete listing of all claims in the application, with their current status listed parenthetically. By this Response, no claims have been amended, cancelled or withdrawn.

Drawing changes

In paragraph 1 of the Office Action, the Examiner objects to FIGS. 1 and 2 because they should be labeled PRIOR ART. In response, Applicant has so amended both FIGS. 1 and 2, and submits replacement drawing sheets. Applicant respectfully requests that the Examiner approve these drawing amendments to facilitate the allowance of this application.

Response to Arguments

Applicant maintains that Webster does not teach the elements recited in the independent claims 11, 16, and 23. For example, claim 11, recites, in part, an ultra-wideband communication device, a first transceiver structured to communicate at a first data rate; and a second transceiver structured to communicate at a second data rate, with the first and second transceivers structured to transmit and receive ultra-wideband signals. **Webster does not teach or suggest a device with a first and a second transceiver.**

The Examiner finds Applicant's claim elements by referring to FIG. 1, which depicts communication between four separate and distinct radios, 103, 105, 107 and 109. The Examiner refers to the figure as illustrating "a mixed signal device containing a transmitter and a single carrier receiver." The Examiner then argues that the second transceiver is "**the same mixed signal device** containing a transmitter and multi-carrier receiver." **So, the Examiner is simply counting the same device twice to find two transceivers!**

Clearly, this is an improper and totally inaccurate analysis of Webster's teachings. Each separate and distinct Webster radio, 103, 105, 107 and 109, contains only one transceiver that has one transmitter, a receiver for single-carrier modulation and a receiver for multi-carrier modulation. Thus, Webster only teaches one transceiver in each device, as each device only has one transmitter. Applicant's FIG. 4 illustrates high-low data rate communication device 60 having two transceivers comprising a high-data rate transceiver and a low data rate transceiver. That is, each device 60 includes two transmitters and two receivers, which is not taught in Webster.

Moreover, as discussed below, any combination of Webster and Richards results in an inoperable combination, and thus the elements of a *prima facie* obviousness case have not been established.

Rejection Under 35 U.S.C. § 103(a)

In paragraph 3 of the Office Action, claims 11-28 stand rejected as unpatentable under 35 U.S.C. § 103(a) over U.S. Patent 6,754,195 ("Webster") in view of U.S. Patent 7,079,827 ("Richards"). Applicant respectfully traverses this rejection.

A. The Law of Obviousness

In order to establish a *prima facie* case of obviousness, three basic criteria must be met:

> "First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined), must teach or suggest all of the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on the applicant's disclosure." M.P.E.P. § 2142.

As explained above, the Office Action makes a Section 103 rejection by combining two references, Webster and Richards. Because a modification to the prior art is required to support this Section 103 rejection, an appropriate motivation to modify must be set forth in order to establish a *prima facie* case of obviousness. *See, In re Fritch*, 972 F.2d 1266 (Fed. Cir. 1992).

The Examiner states the motivation to modify as follows:

> "At the time the invention was made it would have been obvious to modify the mixed signal devices including the first and second transceivers of Webster et al. with the impulse radio transmitter and receiver of the transceivers in Richards et al. One of ordinary skill in the art would be motivated to do this since impulse radios are more energy efficient."

However, Applicant submits that an examination of both references reveals that the Examiner's motivation to modify is based on improper hindsight reconstruction because: 1) the prior art references do not teach all of the claim elements; 2) there is no motivation to combine the references; and 2) there would be no reasonable expectation of success when attempting to combine the references.

I. Reference do not teach all of the claim elements

As discussed above, Webster teaches one transceiver in each radio 103, 105, 107 and 109. A transceiver is comprised of a transmitter and a receiver, so each Webster radio only has one transmitter.

In contrast, all of Applicant's independent claims 11, 16, and 23 each recite a device having TWO transceivers, and thus each device has two transmitters. Webster fails to teach or suggest this claim element. Instead, Webster teaches only one transmitter, and does not suggest using a second transmitter.

II. No motivation to combine references

Webster teaches a wireless communication system configured to communicate using a mixed waveform. Webster teaches that 802.11g (new at the time of Webster's filing) must coexist with the established 802.11b standard. This coexistence is the problem Webster addresses by teaching "continuity between the single-carrier and OFDM (multi-carrier) segments" (col. 5, lines 34-36). Webster achieves continuity by using a receiver design that includes a single-carrier receiver and a multi-carrier receiver (shown in FIG. 2). Each receiver requires power to operate, and thus, this receiver design requires twice the power of a design that only uses one receiver. However, two receivers are necessary to achieve Webster's invention, and the additional power requirement is unavoidable.

However, Richards teaches power control: "[I]f power is kept to a minimum in an impulse radio system, this will allow closer operation in co-site or nearly co-site situations where two impulse radios must operate concurrently, or where an impulse radio and a narrow band radio must operate close by one another and share the same band" (col. 2, lines 10-15).

The Examiner's suggested motivation is to combine is that impulse radios are more energy efficient, which is taken directly from Richards. But Webster is completely unconcerned with energy efficiency. In fact, his invention requires twice the energy of a normal receiver.

Put differently, Webster teaches directly away from energy efficiency, as his invention requires more power than a conventional receiver. But in direct contrast, Richards is all about energy efficiency.

Therefore, one of ordinary skill in the art, looking only at the teachings of the references, would not be motivated to combine them. And thus, the Examiner's motivation to combine can only be based on improper hindsight.

III. No reasonable expectation of success.

Another required element of a *prima facie* case of obviousness requires a reasonable expectation of success. **However, according to M.P.E.P. § 2142.01 "if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious."**

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As discussed in Applicant's originally-filed application, 802.11 is a conventional narrowband communication technology that transmits a continuous radio frequency signal occupying about 5 MHz of frequency band (see FIG. 1, and pages 8-10). Webster teaches that a 802.11 signal occupies only 1 MHz at a -12dB cutoff (see FIG. 4B, and col. 7, lines 54-60).

In FIGS. 4A, 4B, 5A and 5B, Webster illustrates that the QPSK Barker chips and the 802.11a OFDM waveforms are "radically different" (col. 7, lines 62-64). His solution is to provide "continuity between the single-carrier and OFDM (multi-carrier) segments" (col. 5, lines 34-36).

In contrast, Richards teaches an ultra wideband impulse radio system and methods for power control. "[I]f power is kept to a minimum in an impulse radio system, this will allow closer operation in co-site or nearly co-site situations where two impulse radios must operate concurrently, or where an impulse radio and a narrow band radio must operate close by one another and share the same band" (col. 2, lines 10-15).

But how can Richards' radio share the same band with a narrow band radio, like Websters? This is possible because Richards teaches an impulse radio that employs "0.5 nanosecond (ns) pulses" (col. 7, line 57), that operate at "a center frequency of 2 GHz" (col. 8, line 46). Richards' figure 1B illustrates that at a power density above -12dB, a pulse occupies over 4 GHz of radio frequency.

Richard's radio and Webster's radio can coexist because a narrow band radio, like Webster, designed to receive a continuous carrier wave that may occupy up to 5 MHz, will not even "see" the 4 GHz wide Richards pulse, and thus both radios can occupy the same band. Richards illustrates this in FIG. 3, which is similar to Applicant's FIG. 1, which shows ultra-wideband operating in the noise floor, simultaneously with a narrowband 802.11 signal present, like that of Webster.

A Webster receiver, looking for a 5 MHz signal, would only see 1/800th, or 0.125% of the 4 GHz signal transmitted by Richards! Moreover, the Webster receiver is constructed to receive a continuous sinusoidal signal. But Richards transmits individual pulses, each having a duration of 0.5 nanoseconds (as stated by the Examiner, the Richards "transceivers communicate using a train of pulses"). Thus, a Webster receiver, looking for a continuous sinusoidal signal, would be completely unable to receive the pulses transmitted by a Richards radio.

And most tellingly, Webster states that the QPSK Barker chips and the 802.11a OFDM waveforms are **"radically different"** (col. 7, lines 62-64, discussed above). **But these differences are "insanely minuscule" when the narrowband Webster 802.11 signal is compared to the ultra-wideband Richards pulse train.**

Clearly, a fundamental change to Webster's principle of operation is required for the Examiner's proposed combination, and thus there is no reasonable expectation of success.

Therefore, Applicant respectfully submits that the rejection has been traversed, as neither Webster nor Richards teach or suggest the elements recited in Applicant's claims 11-28.

Attached in Exhibit A are two articles about impulse radio (i.e. "ultra-wideband"). They discuss the fundamental differences between narrowband communications and ultra-wideband technology.

Conclusion

Applicant believes that this Response has addressed all items in the Office Action and now places the application in condition for allowance. Accordingly, favorable reconsideration and allowance of claims 11-28 at an early date is solicited. Should any issues remain unresolved, the Examiner is invited to telephone the undersigned.

Respectfully submitted,

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Date

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